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The paradox clearly arises from a misinterpretation of the form $a \div \infty$.

If $u = a^{-1} \sin ax$, then $du \div dx = \cos ax$ is true for all definite values of a, *however great;* and there is no difficulty in the interpretation of the result. But when $a = \infty$ both u and $du \div dx$ become indefinite.

If however $a = \infty$ renders u *infinitesimal,* it still remains a function of x, and there seems to be no good reason why we should then expect $du \div dx$ to equal zero, *independently* of x. Let $u = a^{-1} \tan ax$, then $du \div dx = \sec^2 ax$ which is always greater than unity, though u may be infinitesimal.

If we write $u = a \sin (x \div a) \ldots (1)$, and $du \div dx = \cos (x \div a)$ and then make $a = 0$, the paradox appears in another form. If $a = 0$ (absolutely) then $u = 0$ independently of x; and if $x \div 0$ is a *quantity* $= \infty$ the paradox remains. But if, as I have attempted to show (see ANALYST, for July 1881), $x \div 0$ is only *a symbol* of *impossible conditions,* and not one of quantity, the paradox disappears.

Reject the forms $a.0^{-1} = \infty$, and $a.\infty^{-1} = 0$, and substitute $a.\circ^{-1} = \infty$, and $a.\infty^{-1} = \circ$, $a.0^{-1} =$ sign of impossible conditions, and a host of paradoxes will vanish.

Note. ∞ and $\circ$ are employed as symbols of variables, one increasing without limit and the other decreasing without limit.

C. H. JUDSON.

Greenville, S. C., March 10, 1883.

CORRECTION OF AN ERROR IN BARTLETT'S MECHANICS.—A remarkable error occurs in Bartlett's Analytical Mechanics, ninth edition, p. 178. The solution of the differential equation

$$\frac{d^2 v_y}{dt^2} - m^2 v_y = 0$$

is given as

$$v_y = a e^{mt+c},$$

(in which I have written m^2 for the constant $n^2(A-C)(C-B) \div (A.B)$, supposed positive) and a and c for a_y and c_y the constants of integration. The apparent presence of two constants appears to have induced the belief that the integral thus written was complete; whereas it can of course be written

$$v_y = a_y e^c e^{mt},$$

in which $a_y e^c$ is equivalent to a single constant. Thus the value given is only a particular integral, the complete integral being of the form

$$v_y = Ae^{mt} + Be^{-mt}.$$

The differential equation arises in the solution of simultaneous equations of the first order for the determination of v_x and v_y, and it may be remarked that both this and the preceding solution are faulty in presenting different sets of constants in the values of v_y and v_x, or in all four constants instead of two.

WM. WOOLSEY JOHNSON.